REMARKS/ARGUMENTS

Claims 12-27 are pending.

Claims 12-27 stand rejected under 35 USC §103(a) as being unpatentable over JP 04-121,964 in combination with JP 04-169,067 and Hazbun (U.S. Patent No. 4,791,079) further in combination with Matsuzaki (U.S. Patent No. 5,474,800).

This rejection is respectfully traversed and reconsideration is respectfully requested.

The subject matter of claims 12-27 was rejected under 35 U.S.C. §103(a) as obvious over JP 04-121,964 in combination with JP 04-169,067, U.S. Patent No. 4,791,079 to Hazbun (hereinafter "Hazbun") and U.S. Patent No. 5,474,800 to Matsuzaki (hereinafter "Matsuzaki").

Before discussing each of the references, Applicants point out that the cermet produced by the process recited in claim 12 includes three distinct components: (a) yttria-stabilized zirconia (YSZ) containing a transition metal dissolved therein; (b) nickel; and (c) cerium oxide containing a divalent or trivalent metal dissolved therein. This combination provides multiple unexpected benefits including: (i) enlargement of the electrode reaction field; (ii) excellent performance at high or low operating temperatures; and (iii) prevention of nickel flocculation and subsequent fuel electrode deterioration (see, for example, page 3, lines 14-22, page 9, line 26 through page 10, line 3, and page 12, lines 8-10 of the specification).

JP 04-121,964 (hereinafter '964), as understood from the English language abstract, describes a fuel electrode material for a fuel cell. The fuel cell electrode material can be a cermet in which nickel metal is "carried" by a "mixture" of CeO_2-YSZ. This fuel cell electrode material is said to restrain the precipitation of carbon. '964 does not describe, teach or suggest that YSZ contain a transition metal dissolved therein or that the CeO_2 component contain a divalent or trivalent metal dissolved therein.

JP 04-169,067 (hereinafter '067), as understood from the English language abstract, describes a fuel electrode that includes a solid solution of Ce-oxide and an oxide of alkaline earth metal or rare earth metal in which is dispersed a nickel material. '067 does not

contain descriptions or teachings related to the use of YSZ containing a transition metal dissolved therein.

Hazbun, as understood, describes the prior art as claiming the use of stabilized zirconia doped with titanium dioxide for use as fuel cell electrodes (see col. 2, lines 23-46). Hazbun contains no descriptions or teachings related to the use of nickel or CeO_2 component containing a divalent or trivalent metal dissolved therein.

Matsuzaki, as understood, describes a method for forming a Ni-YZS anode (see col. 1, lines 46-50 of Matsuzuki).

The Office Action states that it would have been obvious to modify the '964 electrode material with the components of '067 and Hazbun. Applicants respectfully submit that such a combination of '964, '067 and Hazbun is an unobvious and unallowable hindsight reconstruction of the claimed subject matter.

'067 does not describe the use of YSZ or YSZ containing a transition metal dissolved therein. Therefore, there appears to be no reasonable suggestion in '067 or '964 that the '067 components can be successfully combined with the '964 YSZ-based electrode material. Nor is there a suggestion that such a combination would provide the multiple unexpected benefits of the current invention.

Furthermore, Hazbun contains no descriptions related to nickel or a CeO_2 component containing a divalent or trivalent metal dissolved therein. Therefore, there is no reasonable suggestion in Hazbun or '064 that the Hazbun components can be successfully combined with the '964 Ni and CeO_2-YSZ-based electrode material or that such a combination would provide the unexpected benefits of the present invention.

The suggested combination of '964, '067 and Hazbun appears to be based on the belief that it would have been obvious to try various combinations of the components described therein. Such an obvious to try basis, however, does not meet the standard of 35 U.S.C. §103. In this regard, the Federal Circuit has stated:

"At best, in view of these disclosures, one skilled in the art might find it obvious to try various combinations of these known scale and corrosion prevention agents. However, this is not the standard of 35 U.S.C. §103."

See *In re Geiger*, 815 F.2d 686, 688 (Fed. Cir. 1987).

Matsuzuki was cited for its teachings related to metallo-organic precursors and screen printing and does not cure the deficiencies of '964, '067 and Hazbun noted above.

Thus, it is respectfully submitted that with the prior art, as taught by the combination of the cited references, it is only possible to obtain the cermets comprising nickel (Ni) and a material in which yttria-stabalized zirconia (YSZ) and CeO_2 material (SDC, etc) are simply mixed, that is, YSZ of Ni-CeO_2 (SDC, etc.).

In contrast thereto, according to the present invention, it is possible to obtain cermets of Ni-CeYSZ and Ni-CeYSZ-CeO_2 (SDC, etc.). With regard to these materials, the most characteristic material in the present invention is the CeYSZ.

In the CeYSZ, material Ce atoms are doped at such positions within a crystal lattice of YSZ as occupied by Zr atoms through an atomic substitution phenomenon. As a result, Zr, Ce and Y are mixed and fused with one another at an atomic level.

By the mixture and fusion of Zr, Ce and Y at the atomic level, the present invention produces an excellent fuel electrode of a solid oxide fuel cell comprising a unique YSZ having such a new and novel function as described below which is never revealed by a conventional, typical YSZ material. That is, in a fuel electrode environment, within a reducing atmosphere such as, for example, at a temperature of 800°C and a partial pressure in oxidation of 10^{-16} atm, it becomes possible to cause the YSZ of the present invention to obtain n-type electronic conductivity. It is in order to obtain such an effect as described above that Ce having a variable valency due to transition metal is fused at the atomic level in YSZ. Thus, in a fuel electrode environment, the CeYSZ of the present invention can have such a surface thereof as becoming a field of electrode reaction where oxygen ion, electron and fuel exist together (coexist). Therefore, according to the CeYSZ of the present invention, it becomes possible to enlarge remarkably the field of electrode reaction thereby obtaining a high capability as a fuel electrode.

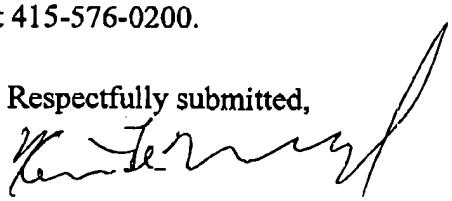
Accordingly, it is respectfully submitted that none of the cited art, either alone or in combination, teach, disclose or even suggest applicants invention as recited in claims 12-27, and therefore, it is respectfully submitted that claims 12-27 are allowable.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



Kevin T. LeMond
Reg. No. 35,933

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 415-576-0200
Fax: 415-576-0300
Attachments
KTL:lo
60075257 v1